****DRAFT****

Fire Regime Condition Class (FRCC) Interagency Handbook Reference Conditions

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Date: 06/08/04

PNVG Code: (CODE) RPWP

Potential Natural Vegetation Group: Great Lakes pine forests: Red pine/White pine stands on Cleland Fire Regime class II.

Geographic Area: Michigan, Minnesota, Michigan

Description: Potential natural vegetation group common to FR2

Fire Regime Description: Fire regime group I with fires occurring every 30 to 40 years and low to moderate intensity (surface fires most common). Severe wind events affect mature stands on an approximate 250 year interval.

Vegetation Type and Structure

Class*	Percent of Landscape	Description
A: post replacement	10	Barrens dominated by carex, grasses, and herbaceous plants. Trees comprise less than 10% canopy coverage.
B: mid-seral	20	Mixed jack pine/ red pine/ oak stands. May include red maple and small patches of aspen/birch.
C late open	55	Open red pine/white pine stands maintained by surface fires
D: late closed	15	Closed red pine/white pine stands
Total	100	

All classes burn at an average rate of 4 % per year with the caveat that stands do not reburn for 10 years. This is equivalent to a 35 year fire return interval. Fire regime/severity assumptions by class follow:

A: **Barrens**: All fires are replacement and set this class back to barrens. Without fire barrens persist for 25 years before they regenerate to jack pine/red pine/oak (50%) or open red pine/white pine (50%).

B: **Mid seral: Jack pine/red pine/oak stands**. Fires in this class are 50 % replacement and 50 % mosaic. Replacement fires result in a young mixed jack/red pine stand (80 %) or barren (20 %). Stands that escape replacement fire succeed to closed red pine/white pine stands (class D) after 100 years.

C **Open red pine/white pine stands**. These open stands are maintained by frequent surface fires. If no fire disturbance occurs for 50 years these stands revert to a closed state (class D). Fires are 20 % replacement and 80 % surface. Since red pine doesn't produce viable sufficient seed until age 50, one-third of the replacement fires result in a barren, while two-thirds of the stands regenerate to red pine/white pine.

D **Closed red pine/white pine.** Closed stands are more susceptible to mortality with 50 % of the fires being replacement and 50 % surface. One-third of the replacement fires result in a barren. The surface fires thin the stand and revert them to class C.

Fire Severity	Fire Frequency (yrs)	Probability	Percent, All Fires	Description
Replacement Fire	60 - 80 years	.015	40	All fires in barrens and 80 % of fires in mature jack pine are replacement
Non-Replacement Fire	30-100	.0167	60	Primarily surface fire in older red pine. Mosaic fire in young classes.
All Fire Frequency*	35	.035	100	

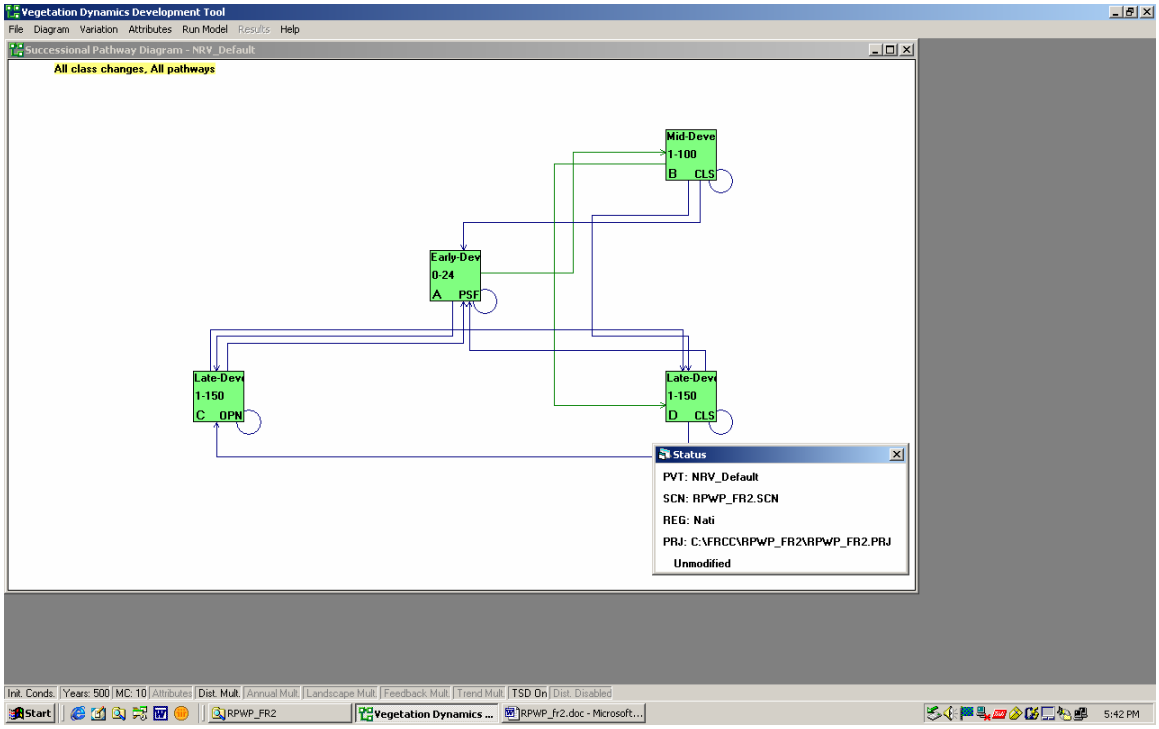
*All Fire Probability = sum of replacement fire and non-replacement fire probabilities. All Fire Frequency = inverse of all fire probability (previous calculation).

References

Cleland

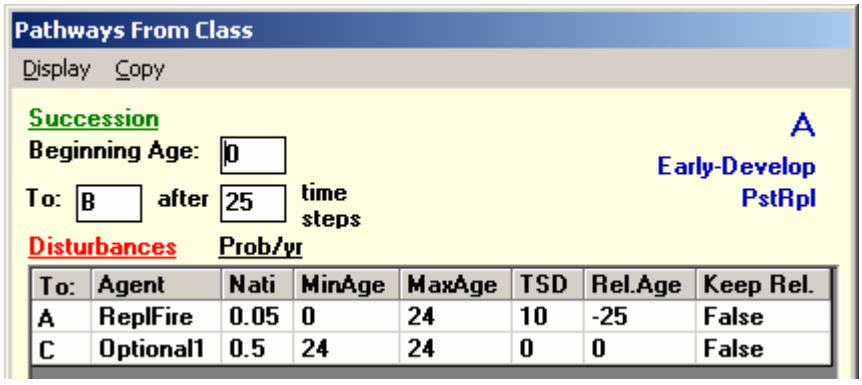
VDDT file documentation

Model RPWP_FR2 located in C:/FCCC/RPWP_FR2: VDDT text files must be loaded into C:/FCCC for project file to work.



Disturbances by class:

Class A: All fires are replacement and occur after 10 years have elapsed since the previous fire (TSD=10). Class A succeeds to a young jack pine stand (Class B). Optional1 disturbance is used to succeed 50 % of this class to open red pine/white pine (class C).



To:	Agent	Nati	MinAge	MaxAge	TSD	Rel.Age	Keep Rel.
A	ReplFire	0.05	0	24	10	-25	False
C	Optional1	0.5	24	24	0	0	False

Class B – jack pine/red pine/oak: Fires are 50 % replacement and 50 % mosaic and occur 10 or more years following previous fire. Replacement fires regenerate to young stands 80 % and barrens 20 % of the time. Stands may also blow down at about a 250 year interval.

Pathways From Class

Display Copy

Succession

Beginning Age: 1

B

Mid-Develop

Clsd

To: D after 100 time steps

Disturbances Prob/yr

To:	Agent	Nati	MinAge	MaxAge	TSD	Rel.Age	Keep Rel.
A	ReplFire	0.004	1	100	0	0	False
B	MosaicFire	0.02	11	100	10	0	False
B	ReplFire	0.016	1	100	0	-100	False
B	WindWethStres	0.002	11	100	0	-100	False
D	Optional1	0.5	100	100	0	0	False

Class C – Open red pine/white pine stands. These open stands are maintained by frequent surface fires. Fires are 80 % surface and 20 % replacement. One-third of the replacement fires result in barrens, two-thirds regenerate back to a pine stand. After 50 years without a fire stands move to the closed state (class D).

Pathways From Class

Display Copy

Succession

Beginning Age: 1

C

Late-Develop

Open

To: C after 150 time steps

Disturbances Prob/yr

To:	Agent	Nati	MinAge	MaxAge	TSD	Rel.Age	Keep Rel.
A	ReplFire	0.003	1	150	10	0	False
C	SurfFire	0.032	1	150	10	0	False
C	ReplFire	0.005	1	150	0	-150	False
D	ClsdPath	1	1	150	50	0	False
D	WindWethStres	0.002	1	150	0	-150	False

Class D – closed red pine/white pine stand: Half of all fires are replacement due to added fuels.

Pathways From Class

Display Copy

Succession

Beginning Age: 1

To: D after 150 time steps

D

Late-Develop

Clsd

Disturbances Prob/yr

To:	Agent	Nati	MinAge	MaxAge	TSD	Rel.Age	Keep Rel.
A	ReplFire	0.0067	1	150	0	0	False
C	SurfFire	0.02	1	150	10	0	True
C	ReplFire	0.0133	1	150	10	0	False
D	WindWethStres	0.002	1	150	0	-150	False

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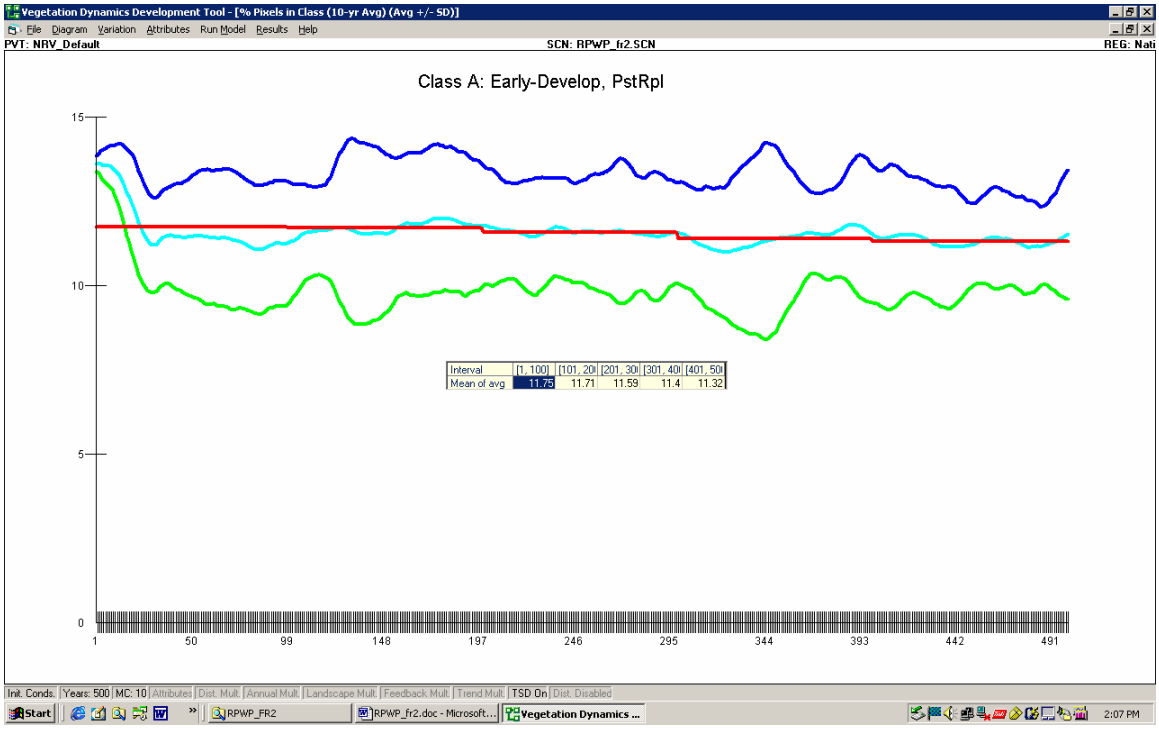
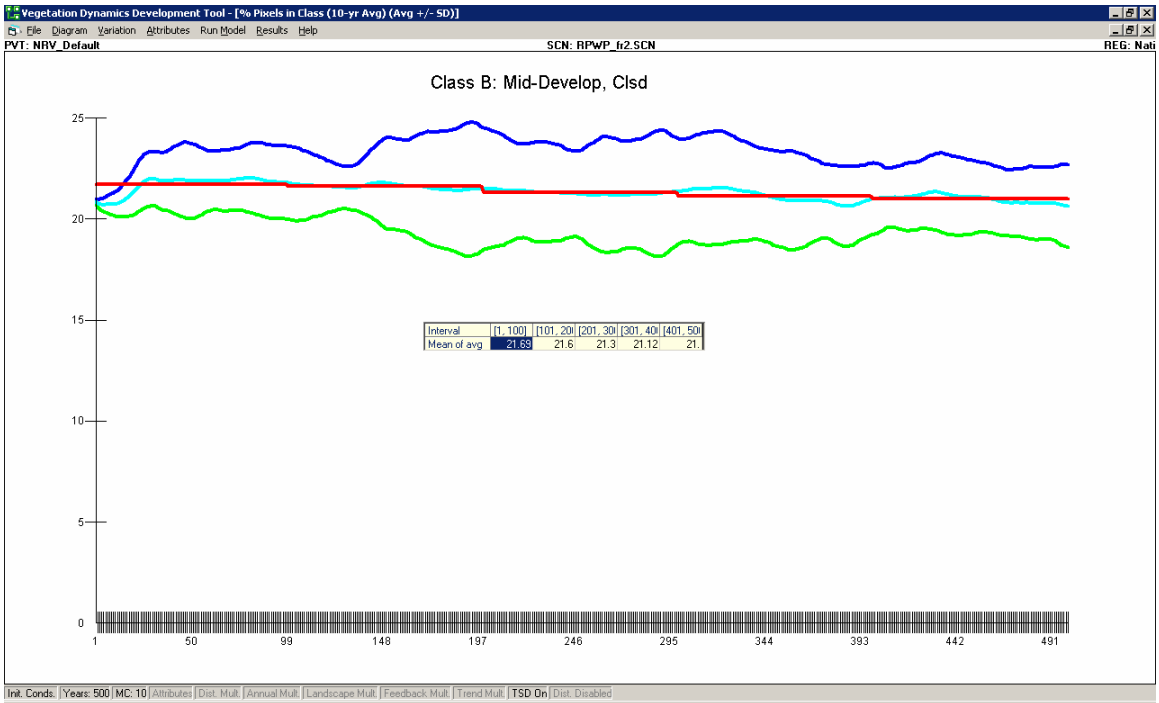
Results graphs: These graphs show the average per cent of area in each class projected for 500 years. These are 10-year-average graphs + or - 2 SD's.




Vegetation Dynamics Development Tool - [% Pixels in Class (10-yr Avg) (Avg +/- SD)]
File Diagram Variation Attributes Run Model Results Help
PVT: NRV_Default
SCN: RPWP_fr2.SCN
REG: Nati
Class B: Mid-Develop, Clsd
25
20
15
10
5
0
1
50
99
148
197
246
295
344
393
442
491
Interval [1, 100] [101, 20 [201, 30 [301, 40 [401, 50
Mean of avg 21.69 21.6 21.3 21.12 21.
Init. Conds. Years: 500 MC: 10 Attributes Dist. Mult. Annual Mult. Landscape Mult. Feedback Mult. Trend Mult. TSD On Dist. Disabled
Start
RPWP_FR2
RPWP_fr2.doc - Microsoft...
Vegetation Dynamics ...
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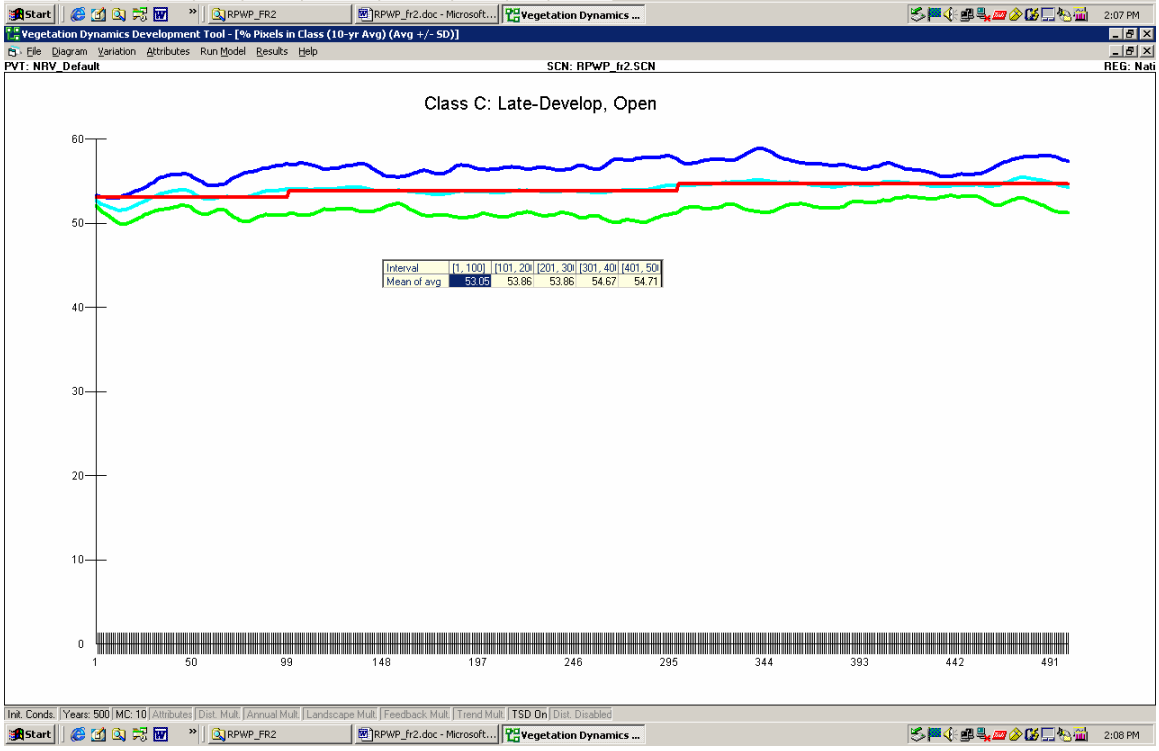
Vegetation Dynamics Development Tool - [% Pixels in Class (10-yr Avg) (Avg +/- SD)]
File Diagram Variation Attributes Run Model Results Help
PVT: NRV_Default
SCN: RPWP_fr2.SCN
REG: Nati
Class C: Late-Develop, Open
60
50
40
30
20
10
0
1
50
99
148
197
246
295
344
393
442
491
Interval [1, 100] [101, 20 [201, 30 [301, 40 [401, 50
Mean of avg 53.05 53.86 53.86 54.67 54.71
Init. Conds. Years: 500 MC: 10 Attributes Dist. Mult. Annual Mult. Landscape Mult. Feedback Mult. Trend Mult. TSD On Dist. Disabled
Start
RPWP_FR2
RPWP_fr2.doc - Microsoft...
Vegetation Dynamics ...
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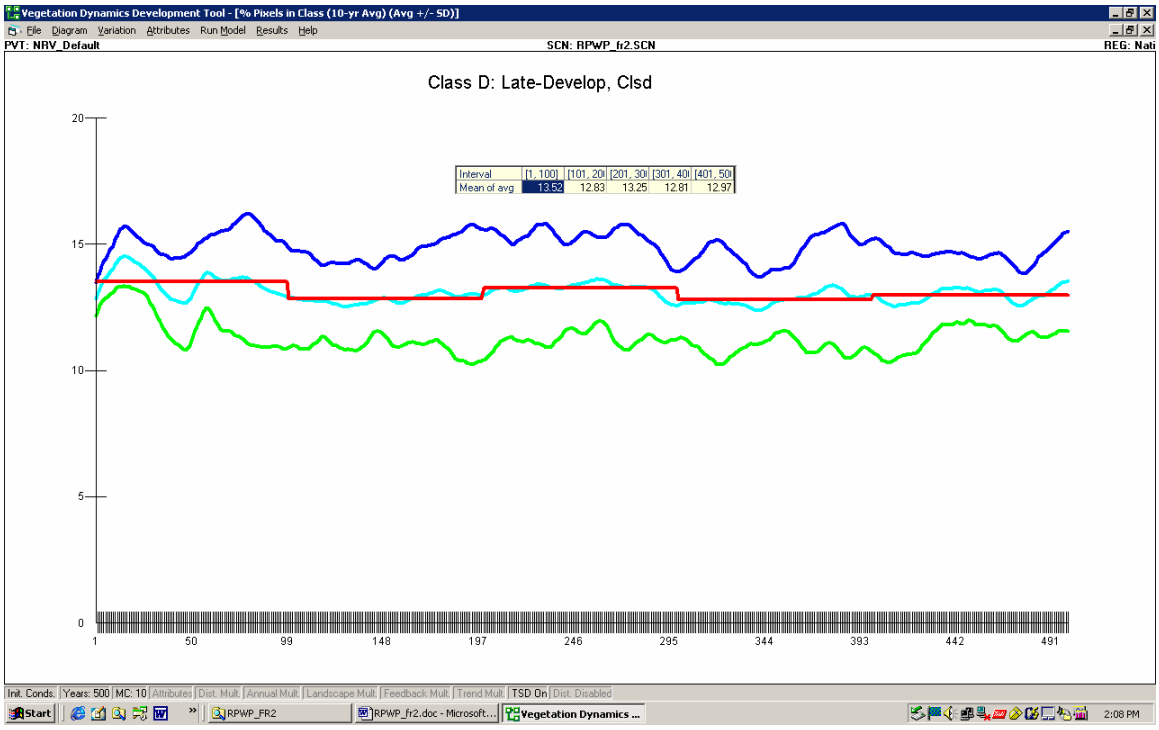
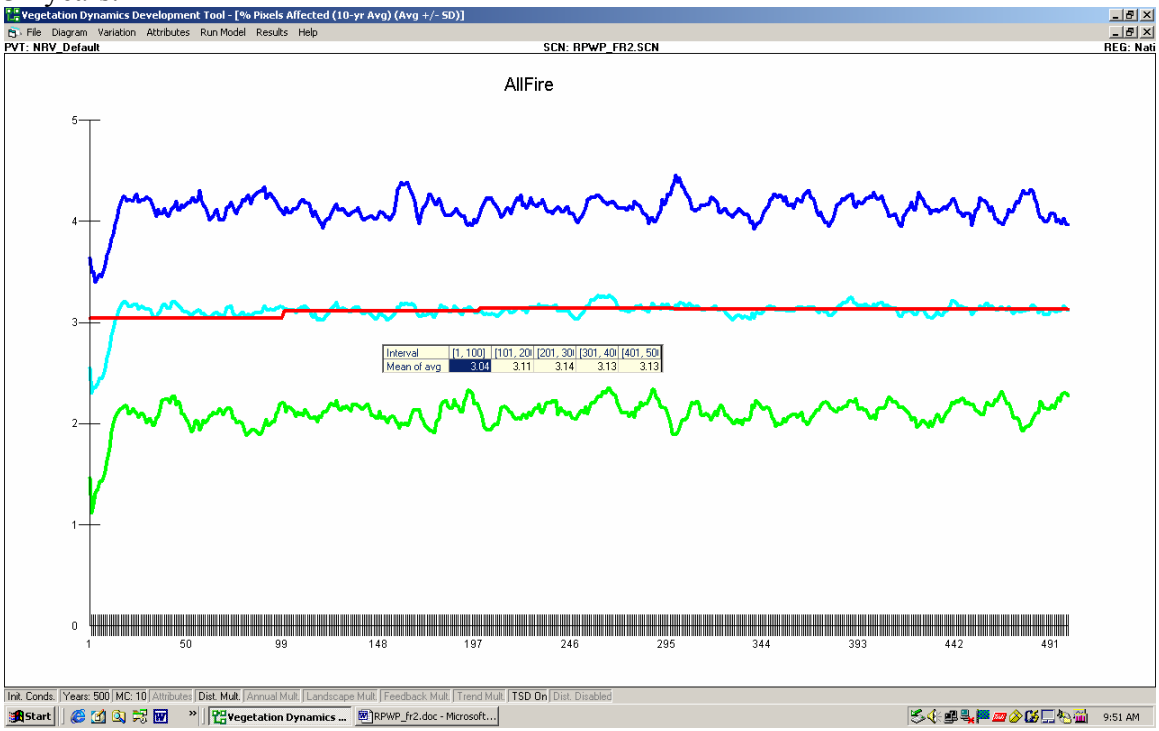
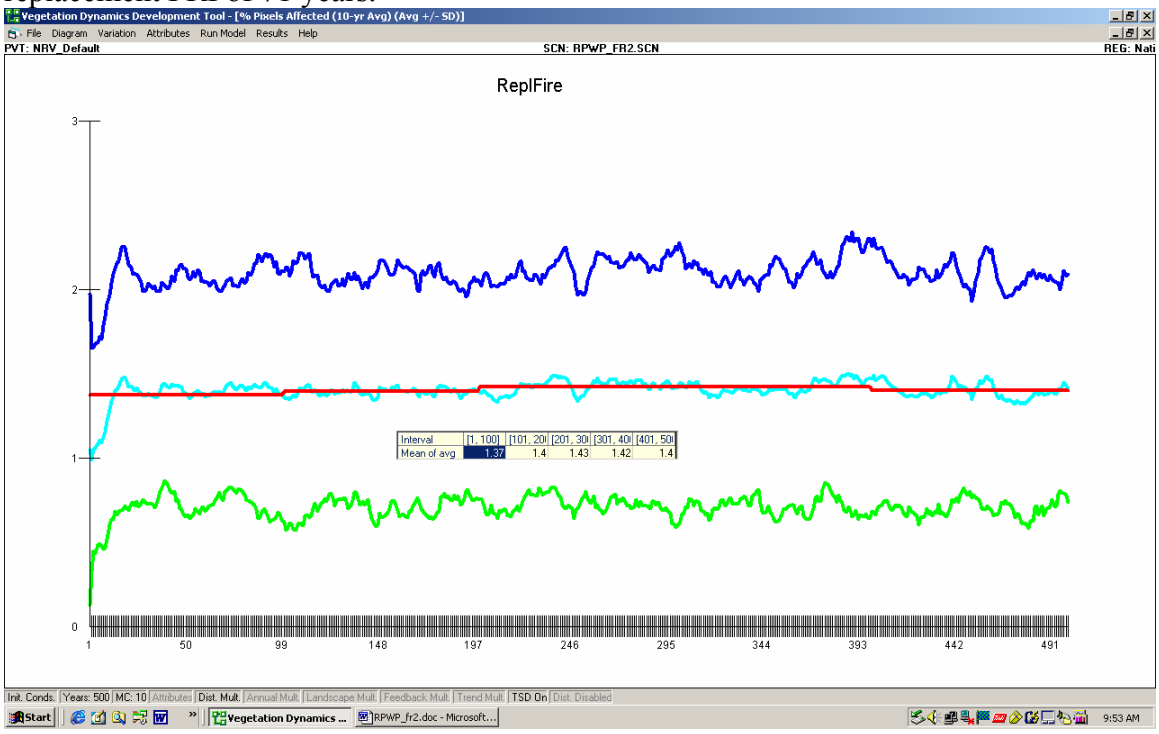


All fire frequency: Approximately 3.12 % of the area burns per year for a FRI of about 32 years.



Replacement fire frequency: Approximately 1.4 % of the area burns per year for a replacement FRI of 71 years.



Non-replacement fire frequency: Approximately 1.72 % of the area burns per year for a non-replacement FRI of about 58 years